



**Further Commentary on  
T-Mobile Application for Variance for  
a Wireless Communications Facility at  
22 Griffin Road, Westford, Massachusetts**

16 July 2010

Broadcast Signal Lab was engaged by the Town of Westford to assist with the review of the T-Mobile application for variances for a Wireless Communications Facility (WCF) including a new tower, at 22 Griffin Road (Site). The applicant seeks a use variance as well as a variance from the 900-foot dwelling setback in the WCF bylaw (6.2.3) and from the 35 foot height limitation in the Table of Dimensional and Density Regulations (Appendix C). Applicant also seeks a variance to the limitation of not more than one principal structure on a lot (4.1.2).

In our Initial Commentary dated May 14, 2010, we summarized topics of inquiry. In short, they are

- Demonstrate inability to use
  - existing wireless facilities,
  - other existing structures, or the 500-foot highway margin,
  - site with no eligible historic assets within 4x the tower height and no visibility to a scenic road,
  - other installations the otherwise comply with §6.2.
  - (in order of priority 1-4, greatest to least) to achieve coverage to all or a substantial part of the claimed gap.
- Demonstrate effect of complying with 100-foot limit
- Demonstrate that higher than 100 feet the proposed tower will promote co-location, reduce the number of towers in the area, or have an overall lesser visual impact.
- Demonstrate effect of complying with 900 and 300-foot setbacks.

Based on these criteria, we recommended in our Initial Commentary that the applicant submit:

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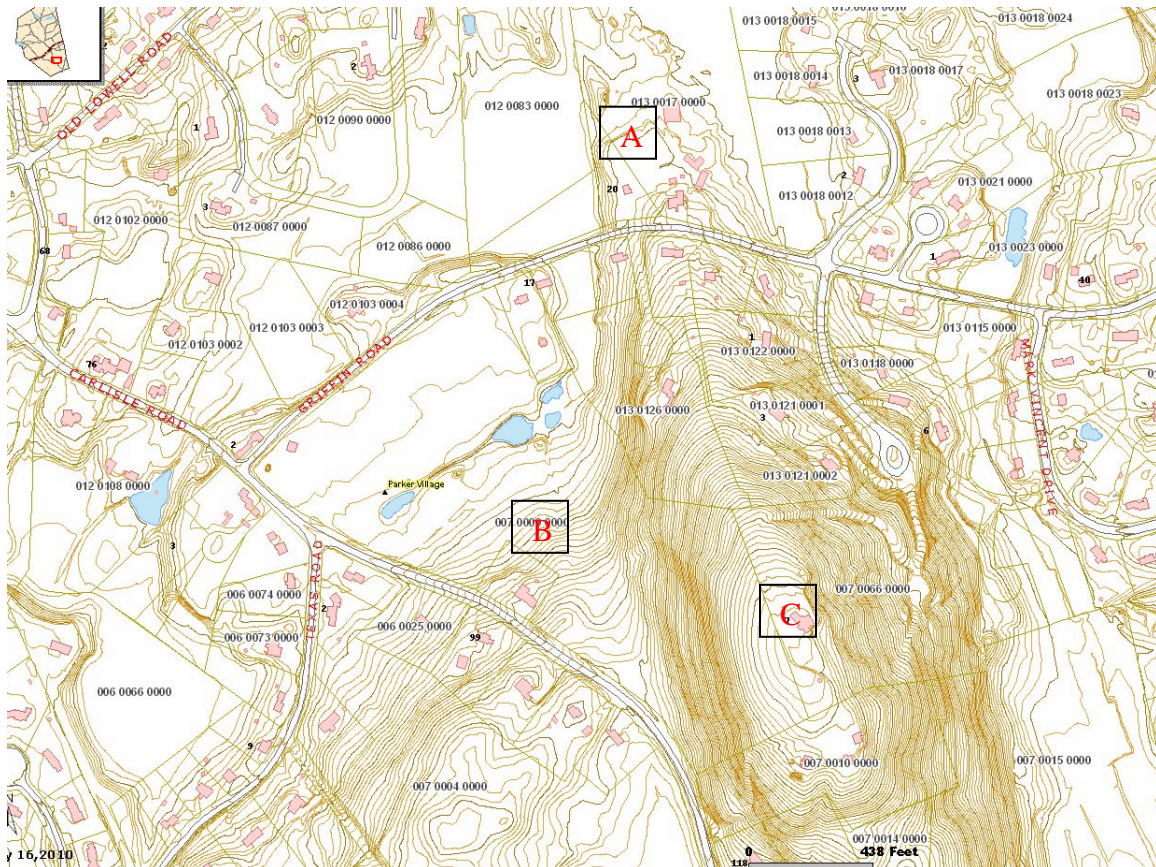
- ✓ documentation of its search for structures in and around the locus of coverage in light of 6.2.3.1 and 6.2.3.2.
- ✓ 100-foot analysis from the Site, and consider and provide examples of bylaw-compliant alternatives that might utilize 100-foot structure(s).
- ✓ map of all locations in and around the desired locus of coverage to illustrate what sites are compliant with the 900 foot and 300 foot setbacks
- ✓ coverage from the closest and most opportune locations within the districts listed in 6.2.3.3.a to illustrate whether and how increased use of these districts, with 100 foot structures could reduce or eliminate the purported coverage gap.

Concurrent with the submission of our Initial Commentary, the applicant submitted a Supplemental Application document. This document provides a detailed written description of the applicant's perspective on the above hierarchy, including discussion of existing structures, a taller tower along the Interstate, large parcels in the area (14), future siting plans, and previous applications denied or withdrawn by T-Mobile. Photosimulations based on a crane test were included. A description of the RF engineer, Scott Heffernan's opinion on the search for alternatives includes his indication that T-Mobile "scrubbed" the area looking for sites and structures. Numerous computer-estimated coverage maps were also included. They depict projected coverage from various heights at the proposed site, as well as projected coverage from the Puma building (one of the nearest alternative sites considered) and from two distant water tank sites.

We leave it to those with local knowledge to identify any existing structures in the vicinity of the proposed facility that might be able to obtain substantial height to serve a substantial portion of the target area. Our view of the area in person and on aerial orthophotography turned up no likely existing structures, other than perhaps the residence at the summit of the hill south of the proposed facility (parcel 07 0066 0000 – marked C on the map below). A wireless facility on a short tower slightly above tree canopy in Stow was approved many years ago with a similar topographic and land use characteristic.

The land southeast of the athletic fields at Jack Walsh Recreation Area is owned by the Town and has some terrain that may not be too steep for a new tower facility (marked B on the map below). That terrain is behind the residence whose parcel is surrounded by the Town parcel. Such a tower location would require a new driveway to penetrate the parcel. The tower might be able to meet

the 300 foot setback to residences, but not the 900. Such a location, next to a hill with a steep rise of 70 feet, would substantially obstruct the signals directed east and northeast. If this location is of interest, the applicant should provide a computer model of a 100 foot and a 150 foot tower to illustrate its potential. The potential visual impact of the tower on the residences on the hill should be considered. It must also be noted that to lease town property for the long term, Town Meeting must authorize the Selectboard to do so.



The proposed site, and the locus it would serve, is a substantial distance, in wireless coverage terms, from I-495, especially considering the intervening terrain.

Mr. Heffernan argues a legal question regarding the jurisdiction of the Board over certain alternatives. I agree that the home wireless router (“femtocell”) is not a fix for overall coverage. It only addresses the private coverage needs of a very small number of the subscriber’s own cell phones simultaneously, and only within the home or a few yards from it.

On the other hand, Mr. Heffernan perpetrates myths about the Distributed Antenna System. Such remarks as “the power from a DAS solution is reduced 50% for each additional channel or carrier required. Aside from the math being incorrect, this myth was based on earlier, poorly designed networks. Today such networks are designed for expansion. In fact, that is the whole point of DAS – scalability, as the number of carriers on the network grows, and the amount of capacity required by subscribers increases, DAS is a more scalable solution than new towers.

The RF engineer also suggests that DAS is a technology over which the FCC has jurisdiction. The wireless industry conflates the FCC technological neutrality for assigning wireless spectrum with an all-out ban of decisions by local boards that affect the “technology” a carrier must use. We have been participating in wireless facility proceedings for decades. It may be interesting to note that the very familiar monopoly was originally a “new technology.” Wireless carriers and tower companies resisted using them. The same goes for certain “stealth” (antenna-hiding) configurations such as the faux flagpole. Both “technologies” are now de rigueur.

The Town’s zoning interest is indeed in minimizing the impacts of new wireless facilities while enabling the provision of service. From a zoning perspective, the issue is not whether the zoning solution is DAS or left handed monkey wrenches. The issue is of whether the Town can encourage the use of numerous low-profile antennas on existing structures such as utility poles. Their use does not have to be DAS as described by the RF engineer. In fact, in Wellesley Massachusetts, T-Mobile has a network that is not DAS per se, but a set of several “microcells.” The RF engineer is incorrect in numerous other ways, including the premise that fiber has to already be present on poles when the applicant arrives on the scene. This is like saying the proposed tower has to be already present for T-Mobile to be able to use it. The onus is the same-to provide wireless coverage, the onus is on the carrier to balance the zoning interests of the community with the coverage interests of the Telecom Act; the carrier must build its infrastructure if there is nothing there to support it. In another dissemblment, the RF engineer suggests that the approach to providing numerous little antenna nodes on utility poles is like turning a wireless network into a wired one. He neglects the fact that the vast majority of wireless facilities in metro Boston use “phone lines” to connect the cell sites back to the carrier’s telephone and data networks. The wireless network is necessarily wired until the “last mile” (or last 100 yards as the case may be) between the carrier’s network and the wireless subscriber.

Now that we have completed our brief tirade against the misinformation in the RF engineer's report (the incorrect statements are too numerous to belabor here), we nevertheless suggest that the technical analysis of the prospects for a DAS in the subject area are indeed bleak. Because of the limited density of development, the subject area is not a strong candidate for a utility pole mounted solution. There are much more densely developed areas that provide a greater opportunity to address with such solutions.

On the question of the marketing coverage maps submitted by a resident, and obtained from the official T-Mobile website, the question is a perplexing one. The Telecomm Act simply addresses not prohibiting "the provision of personal wireless services." What level of coverage constitutes a gap in service that is significant enough to be covered by the Act? Is the "moderate" signal level shown on the T-Mobile marketing maps sufficient quality to be considered "the provision of service." Or is it the very high performance threshold depicted by T-Mobile (-84 dBm) that is the gold standard for a significant gap. The courts are the ones to thresh this out. From a technical perspective, we understand from T-Mobile testimony in other cases that the marketing maps are based on the same underlying data as the engineering maps. The difference is the marketing maps have a smoothing algorithm to make them prettier, and utilize performance thresholds to indicate where phones will work, even if not at T-Mobile's ideal level of performance.

If there were alternatives that came close to serving what T-Mobile convinces the Board is the gap, we can sharpen the pencil to see if any remaining "white space" in the map left by the alternative really is an issue or not. When the white space is large, it is more likely that some of the white space will be wholly unreliable. At the moment, we do not see alternatives for which this closer inspection of coverage is necessary. The one exception is height.

If reducing the height of the proposed facility makes a significant difference in the visual impact of it, then we can closely examine the alternative coverages from lesser heights. Keep in mind that reduced height equals reduced co-location potential. The Board has the opportunity to make the necessary trade-off, based on our view of the coverage plots.

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